Load Forecast Model Development

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Resource Adequacy Planning

Load Analysis Subcommittee
October 27, 2022

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Consultant Engagement

- After an RFP process, PJM engaged with Itron starting in late April to perform a model review and to make recommendations for potential model enhancements as we transition to an hourly model for the 2023 Load Forecast.
  - Early discussion and feedback session at Load Analysis Subcommittee (LAS) on June 10, 2022
  - Itron presented their review and recommendations, and solicited feedback at LAS on July 28, 2022
  - Itron delivered their final report to PJM consistent with their presentation from July 28, 2022

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Itron's Recommendations

1) Replace Annual/Quarterly End-Use Indices with Monthly/Daily Indices
   a) Discussed method at 9/12 LAS.

2) Continue with Weather Simulation Approach
   a) Discuss results of today.

3) Replace Daily Models (Energy, Zone peak, and Coincident peak) with Hourly Load Models
   a) Discussed at 9/12 LAS. Results to be discussed today.

4) Adjust Loads for Solar and New Technologies Through the Simulation Process
   a) Discussed at 9/12 LAS.

5) Capture Increasing Temperature Trends
   a) Discussion deferred to next year.

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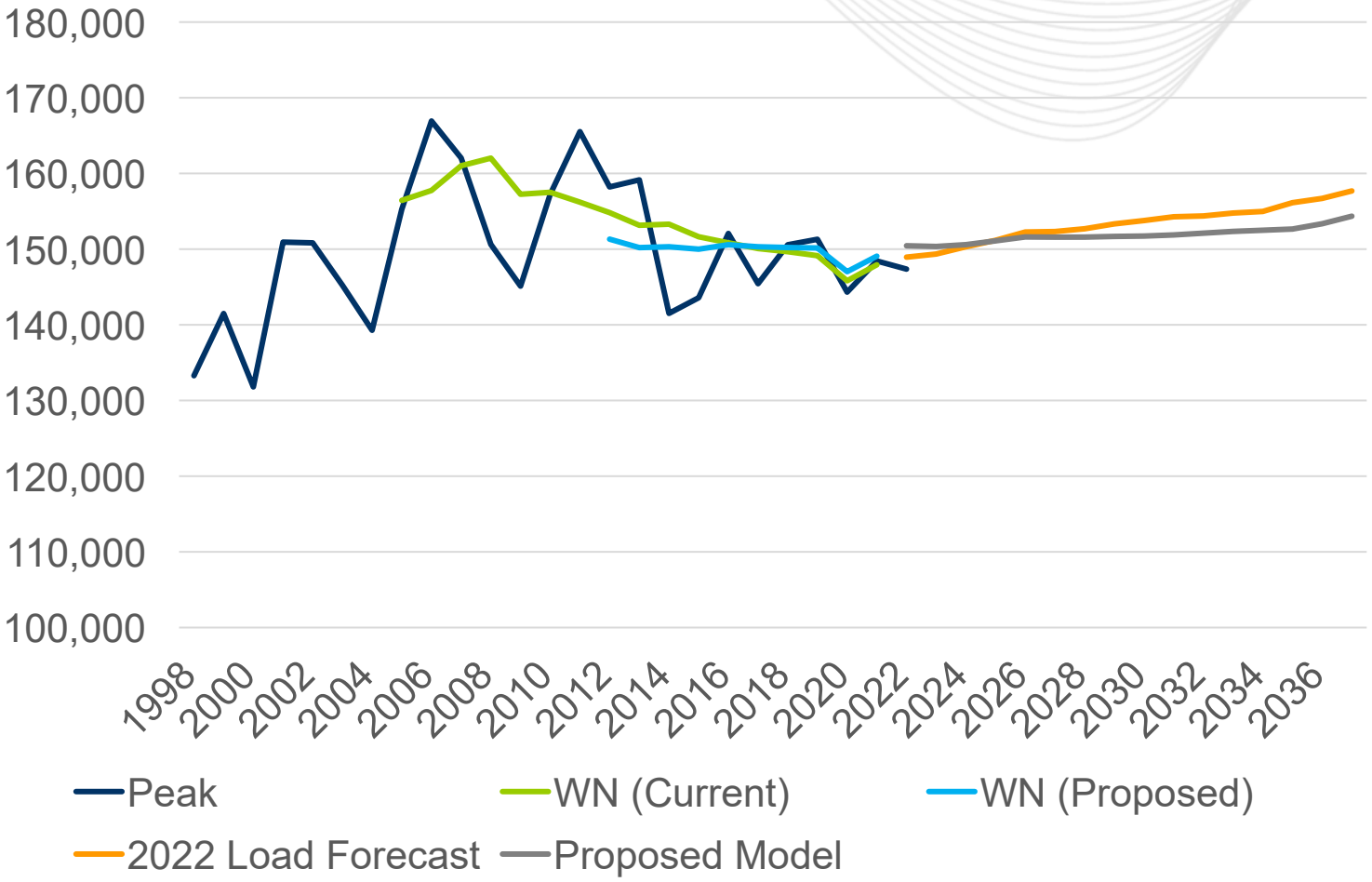
RTO 50/50 Summer Peak Forecast



- Slightly higher starting point
  - 2022 – up 1%
- Slightly slower 15-yr average annual growth rate
  - 0.2% vs 0.4% currently

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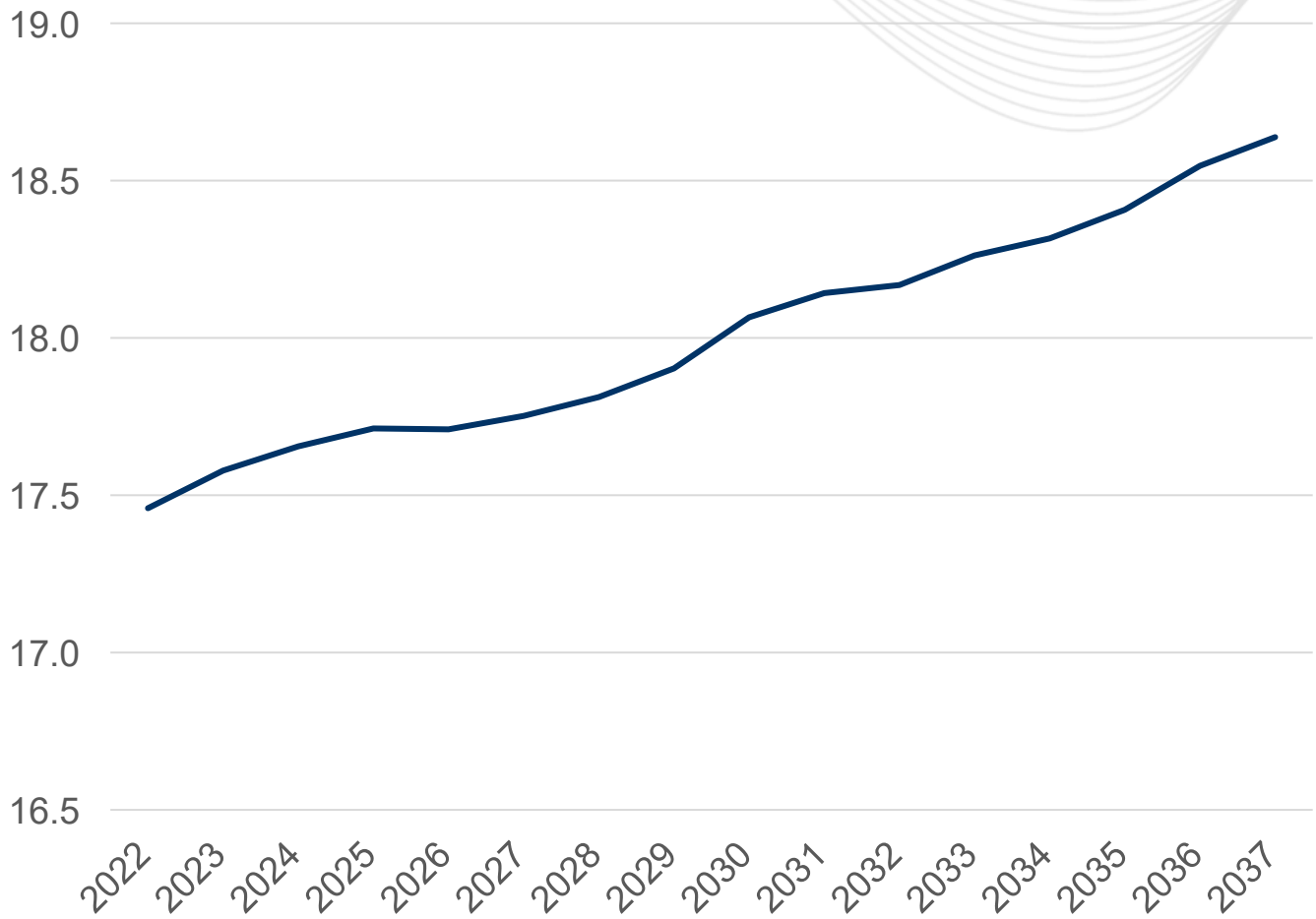
Average Hour of Summer Peak



- Continued penetration of Behind-the-Meter Solar pushes the peak to later hour

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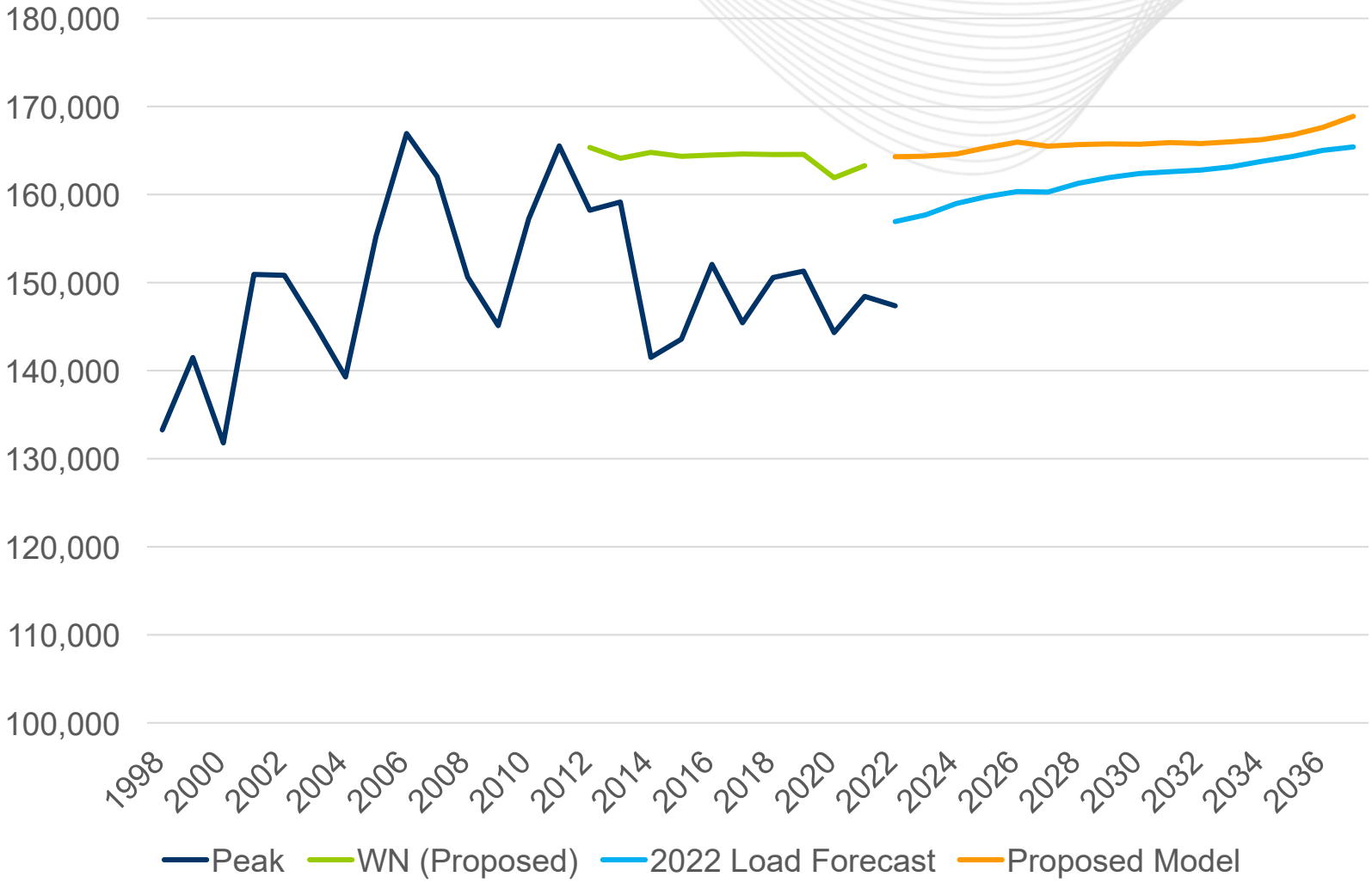
RTO 90/10 Summer Peak Forecast



- Higher level
- Slightly slower 15-yr growth

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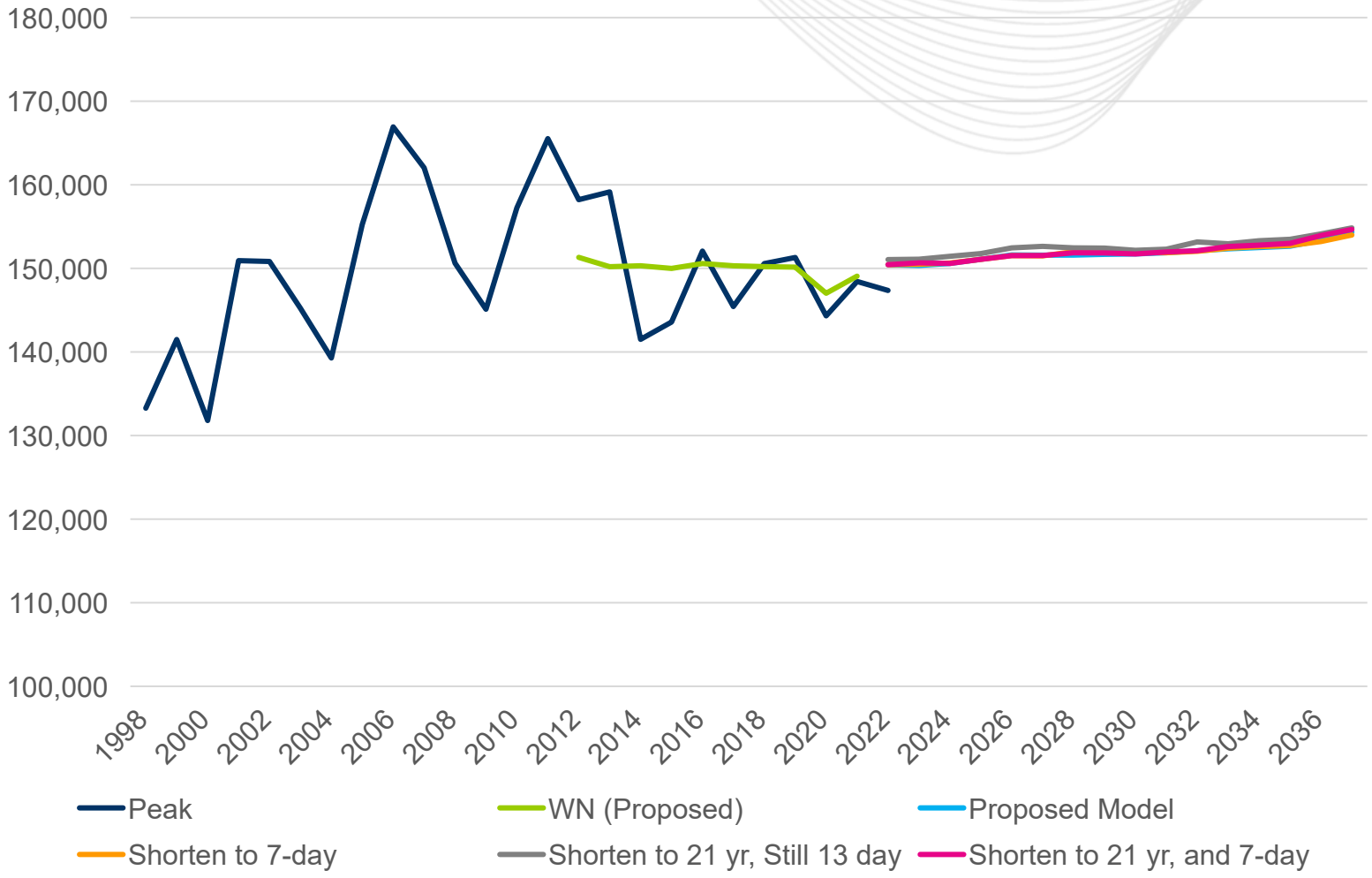
RTO 50/50 Summer Peak Forecast
Impact of Weather Simulation Proposal



- No significant impact to 50/50 forecast from changing the weather simulation

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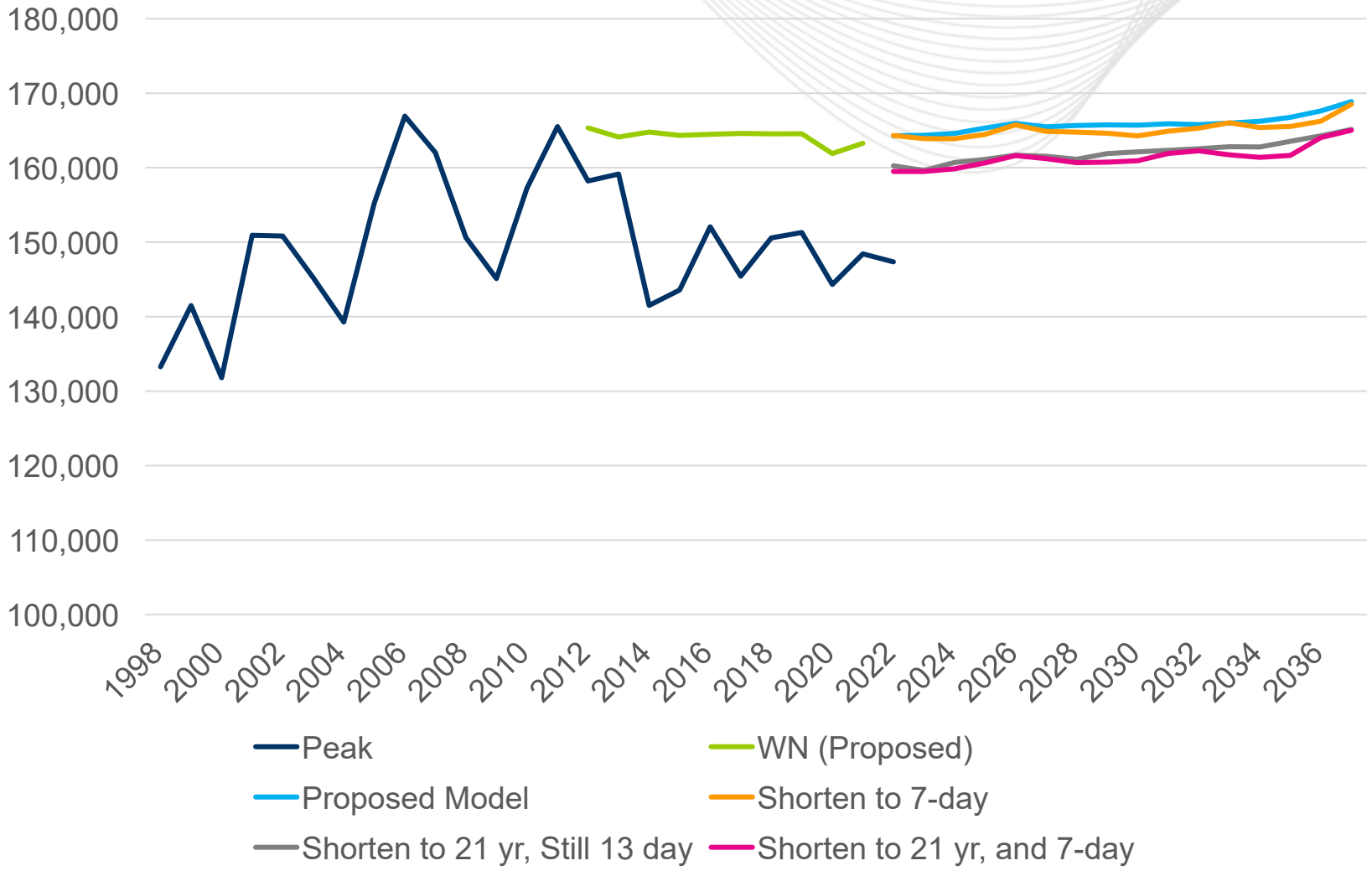
RTO 90/10 Summer Peak Forecast
Impact of Weather Simulation Proposal



- Extreme values are lower with shortened weather simulation

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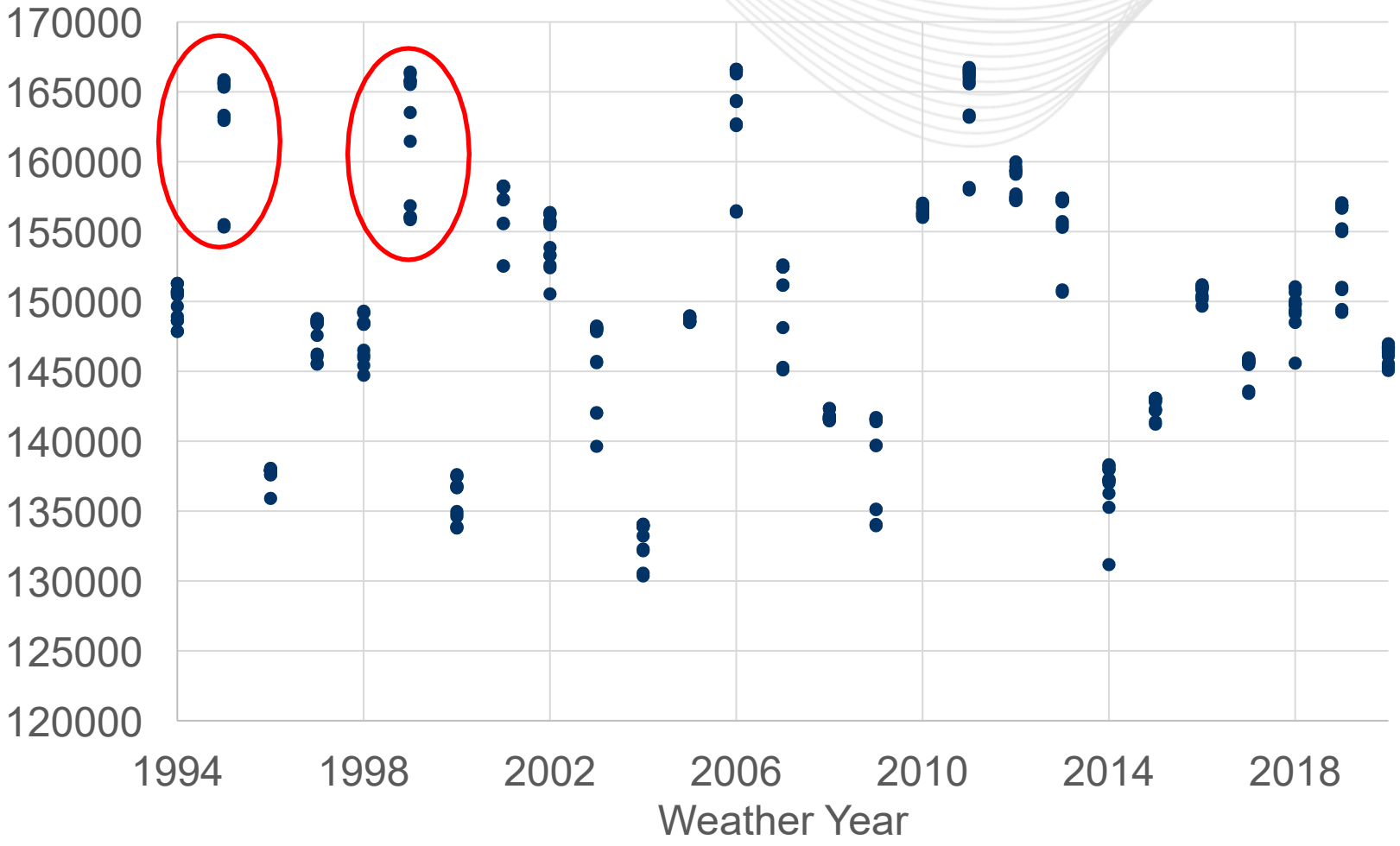
2022 Summer Coincident Peak Distribution by Weather Year



- Exclusion of relatively hot years in 1995 and 1999 causes the 90th percentile to move lower.

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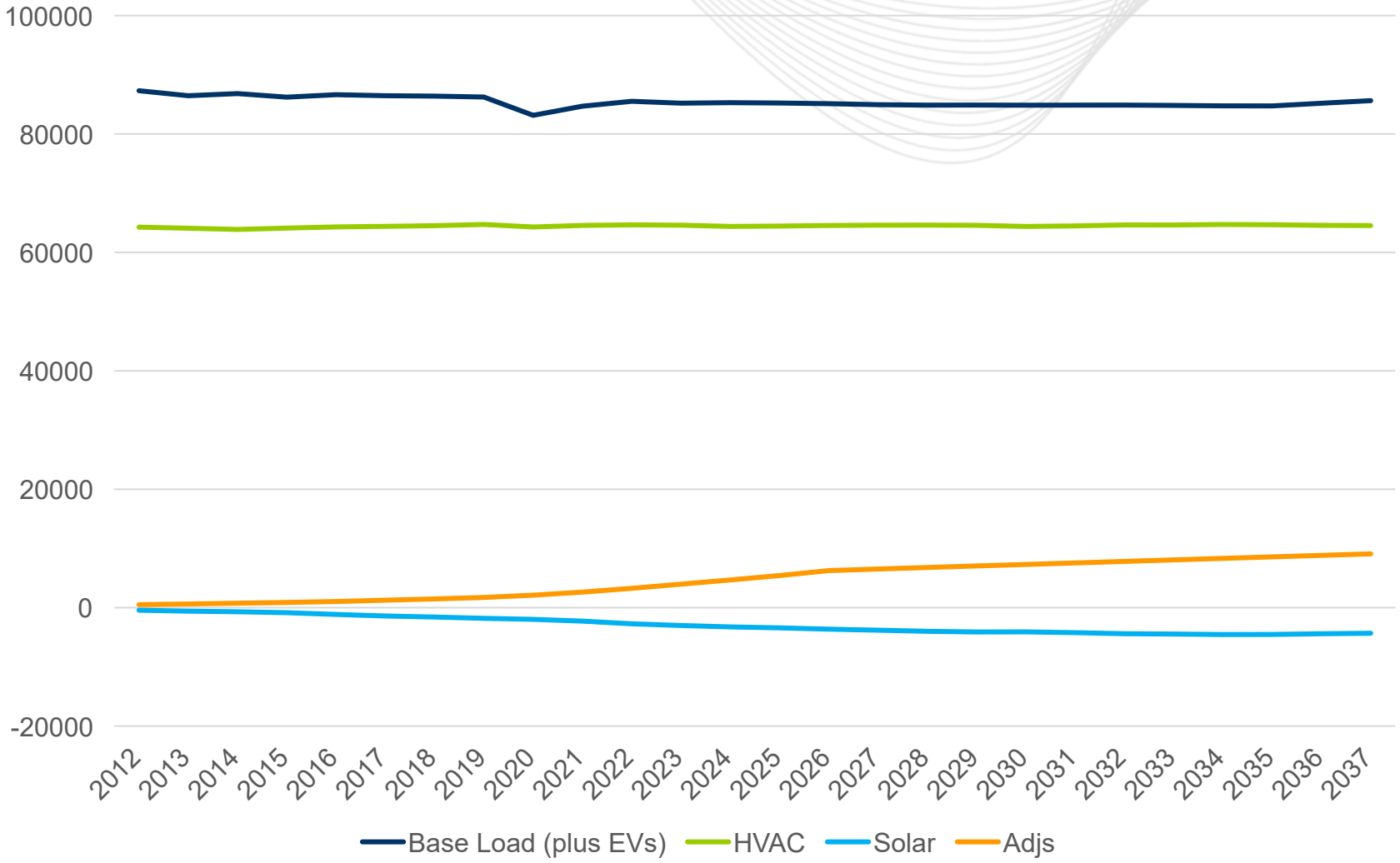
Decomposition of Summer Peak Load



- Base and HVAC load are generally flat
- Movement in growth mostly due to solar and adjs (data centers)

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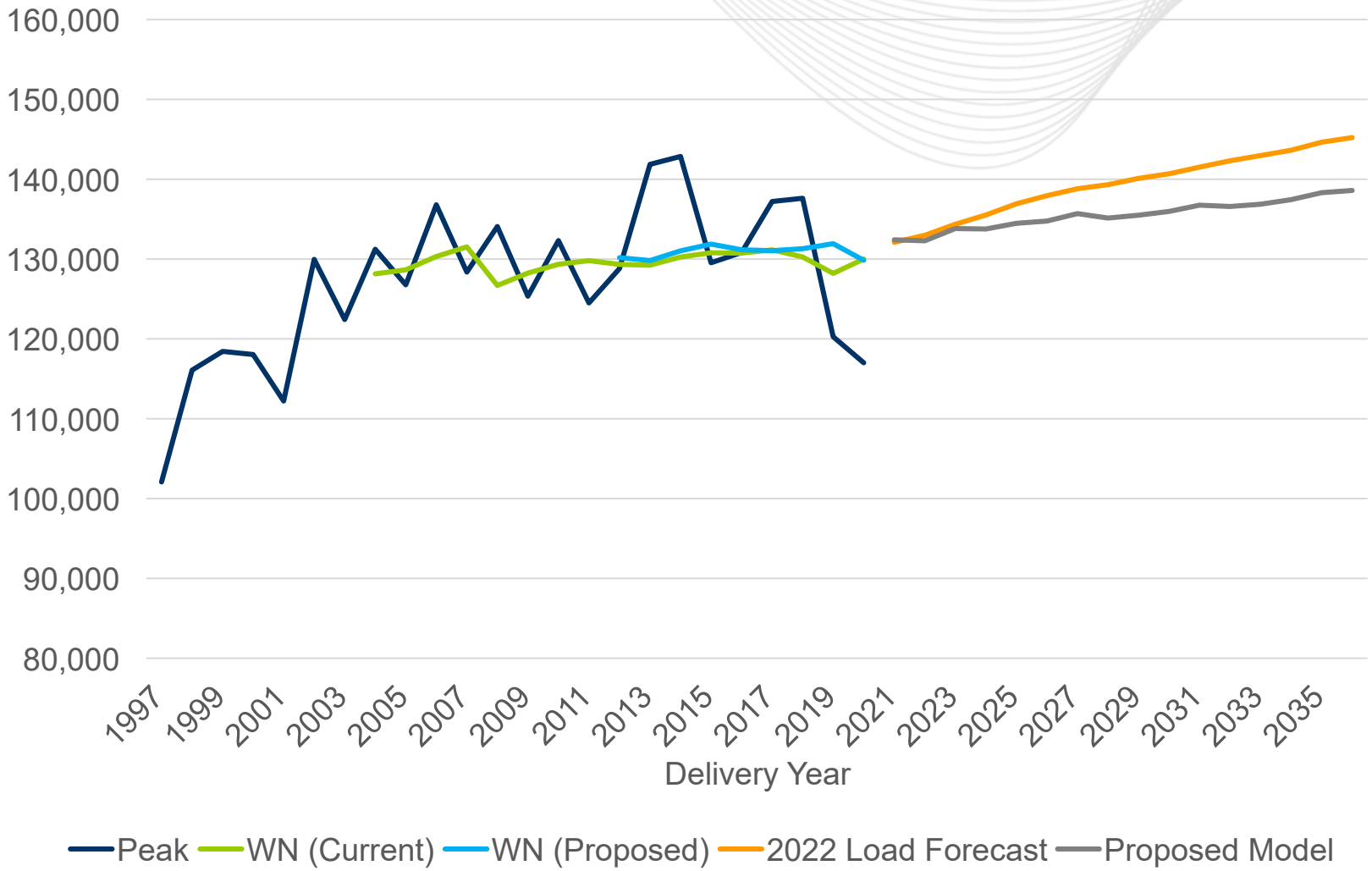
RTO 50/50 Winter Peak Forecast



- Very similar starting point
- Slower 15-yr average annual growth rate
  - 0.3% vs 0.6% currently

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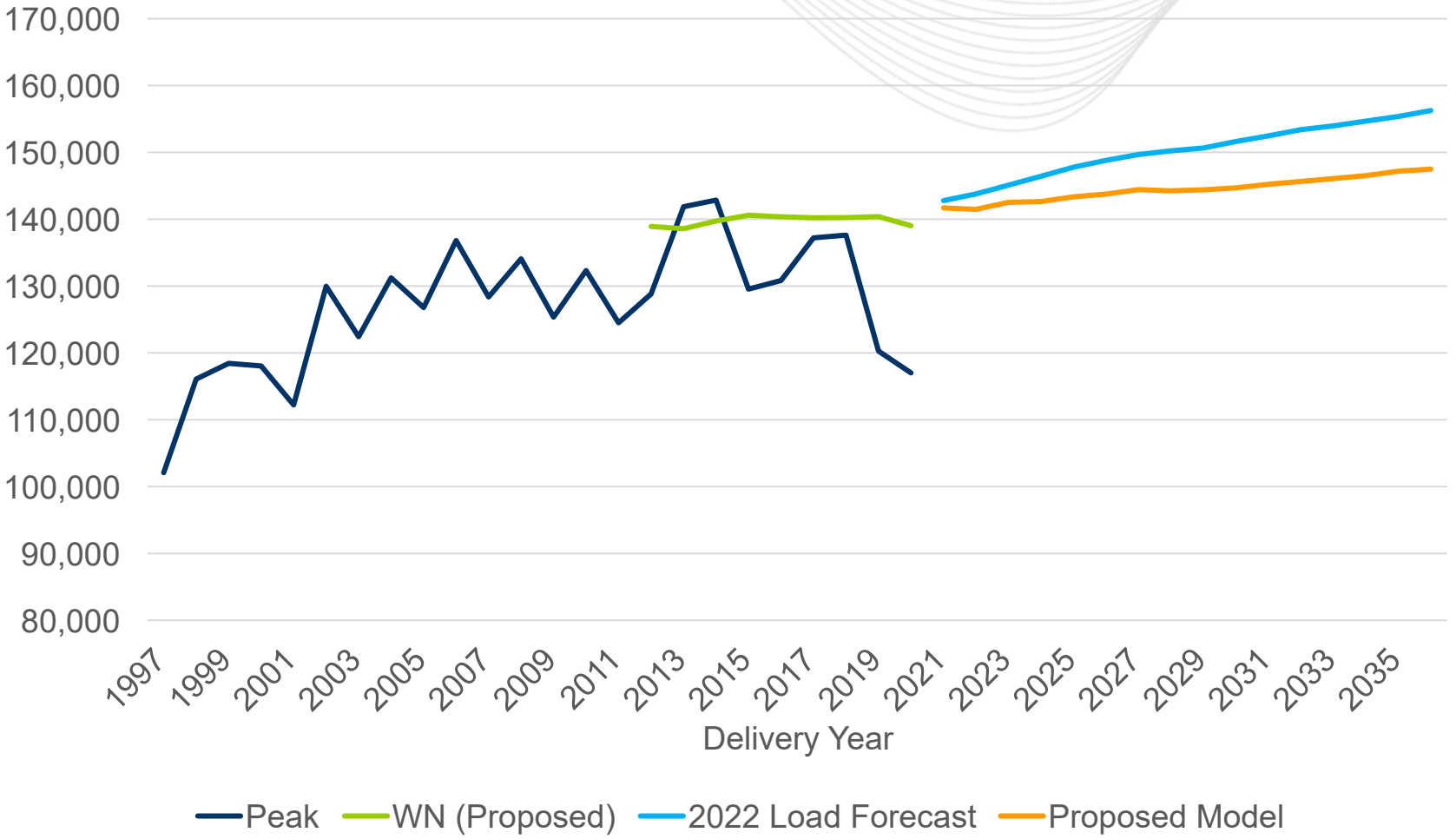
RTO 90/10 Winter Peak Forecast



- Lower starting point
- Slightly slower 15-yr growth

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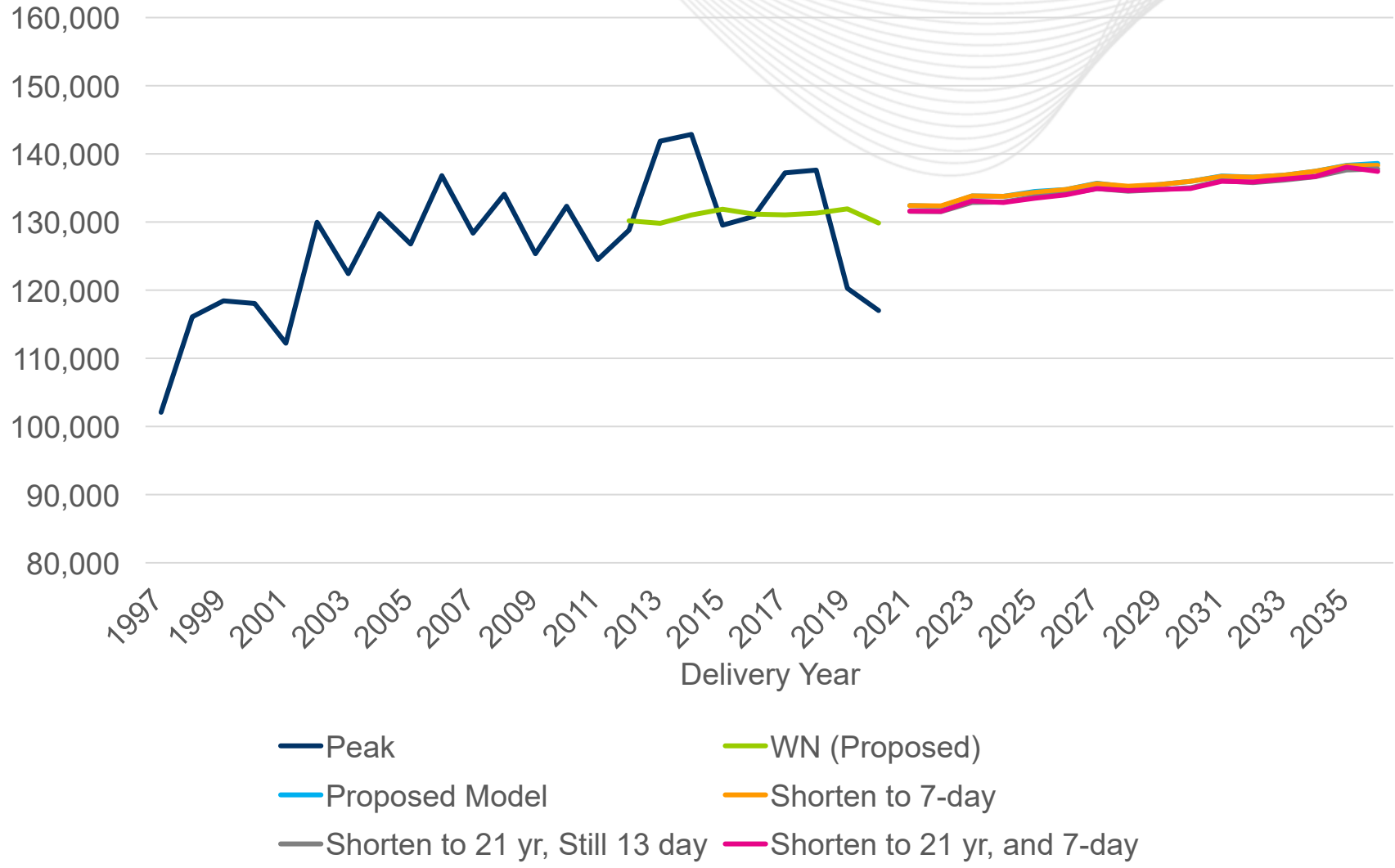
RTO 50/50 Winter Peak Forecast
Impact of Weather Simulation Proposal



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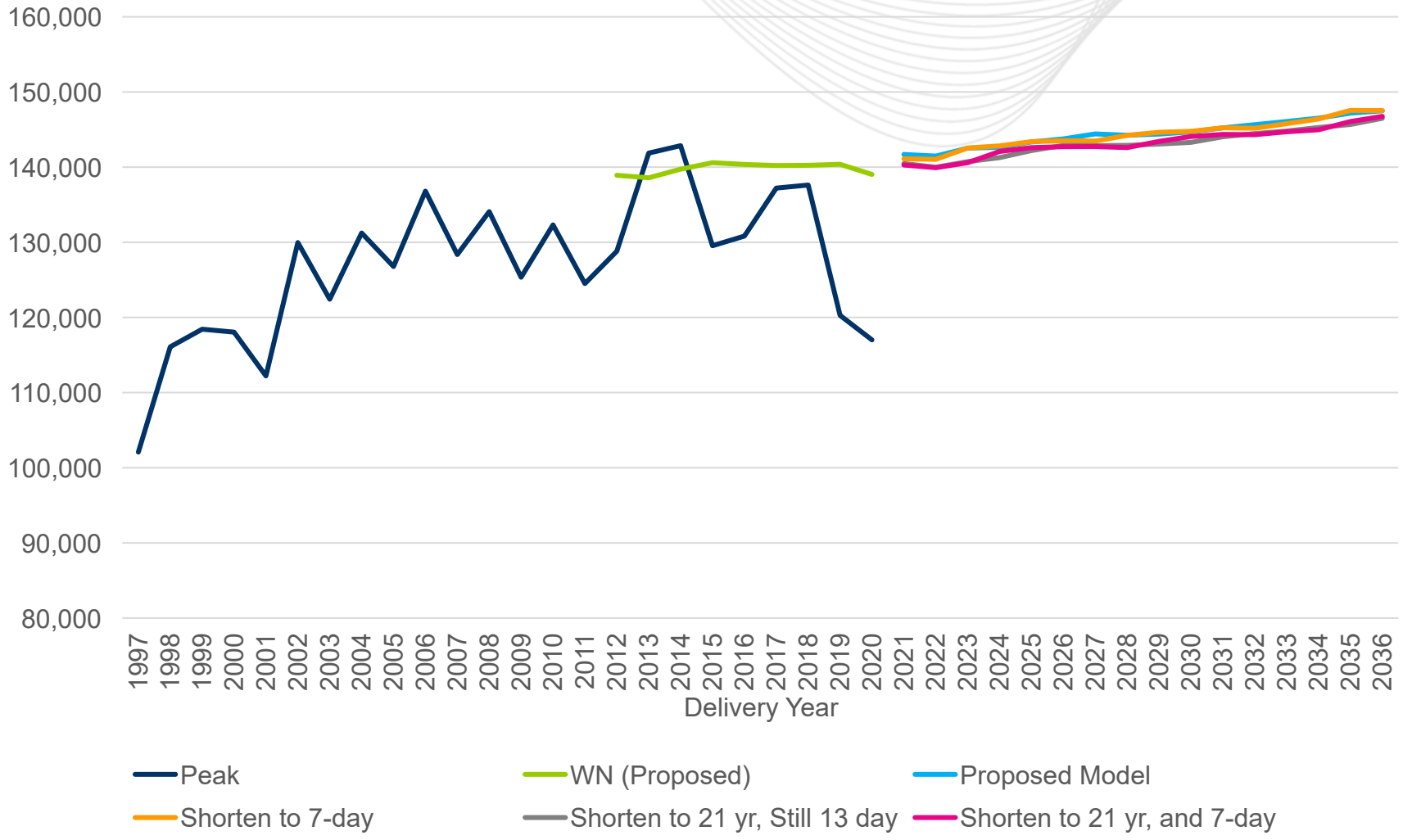
RTO 90/10 Winter Peak Forecast
Impact of Weather Simulation Proposal



- Relatively small negative impact (~1%)

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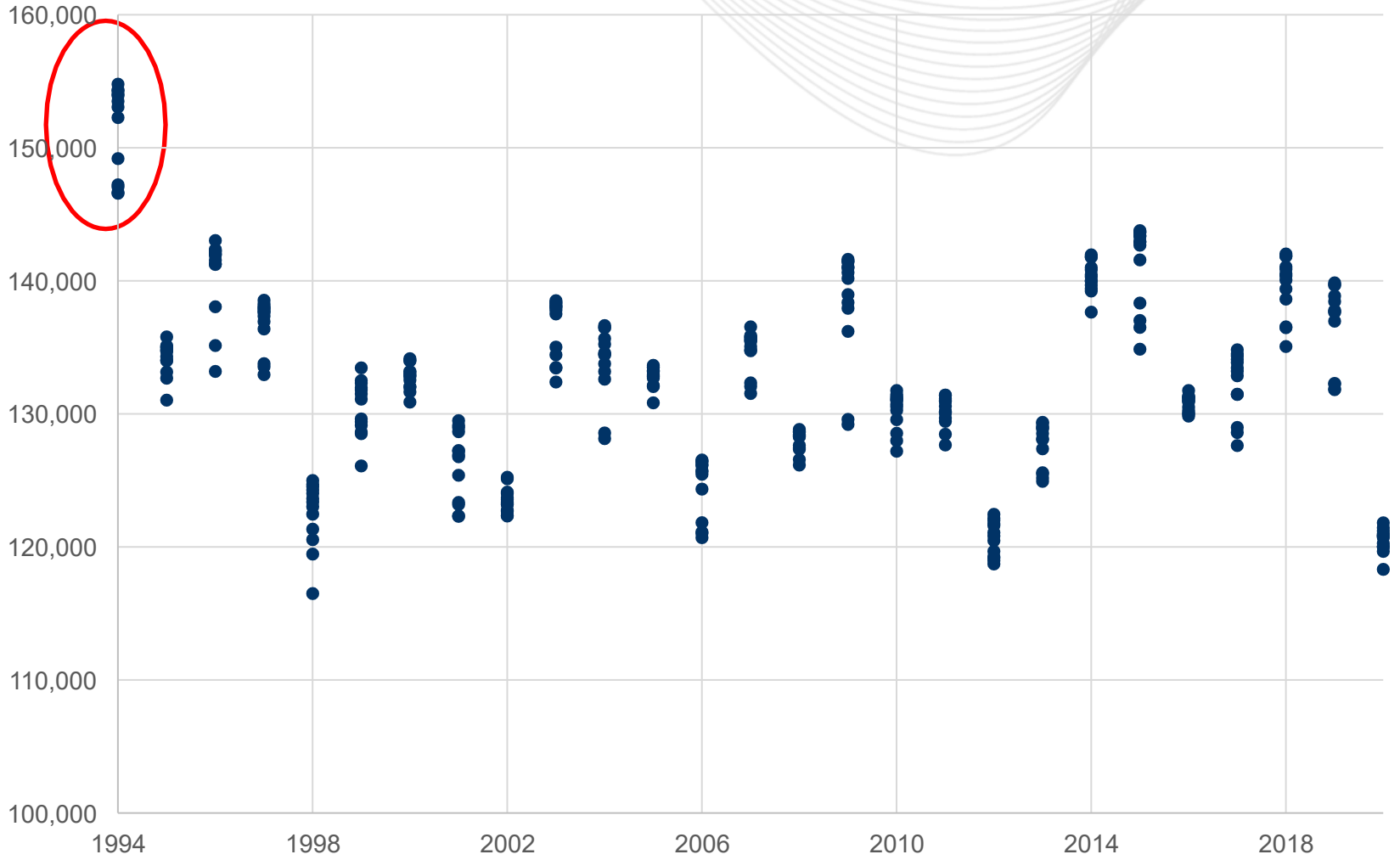
Winter Coincident Peak Distribution by Weather Year



- Exclusion of 1994 winter would not have significant impact on 90th percentile, but would narrow the distribution.

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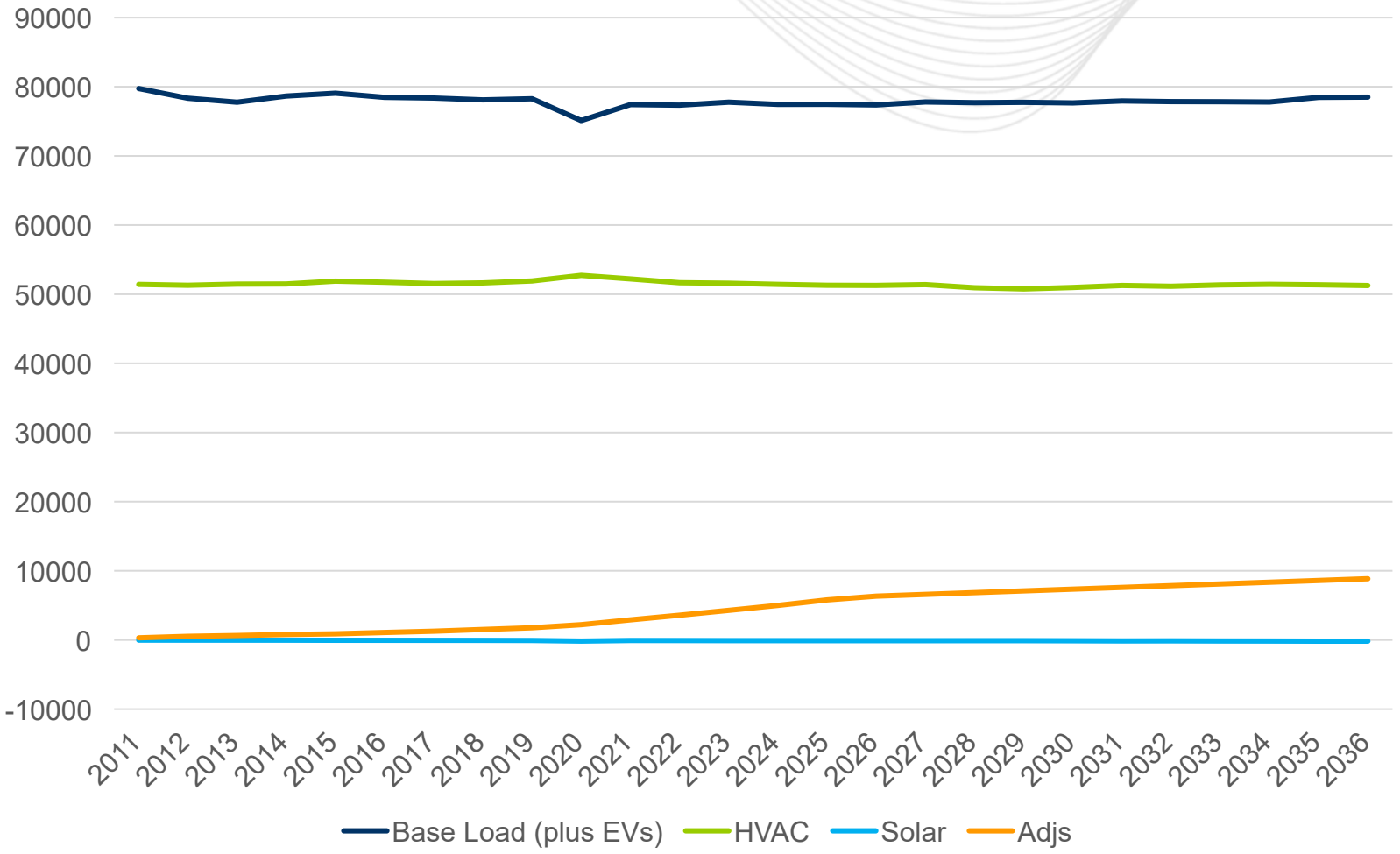
Decomposition of Winter Peak Load



- Base and HVAC load are generally flat
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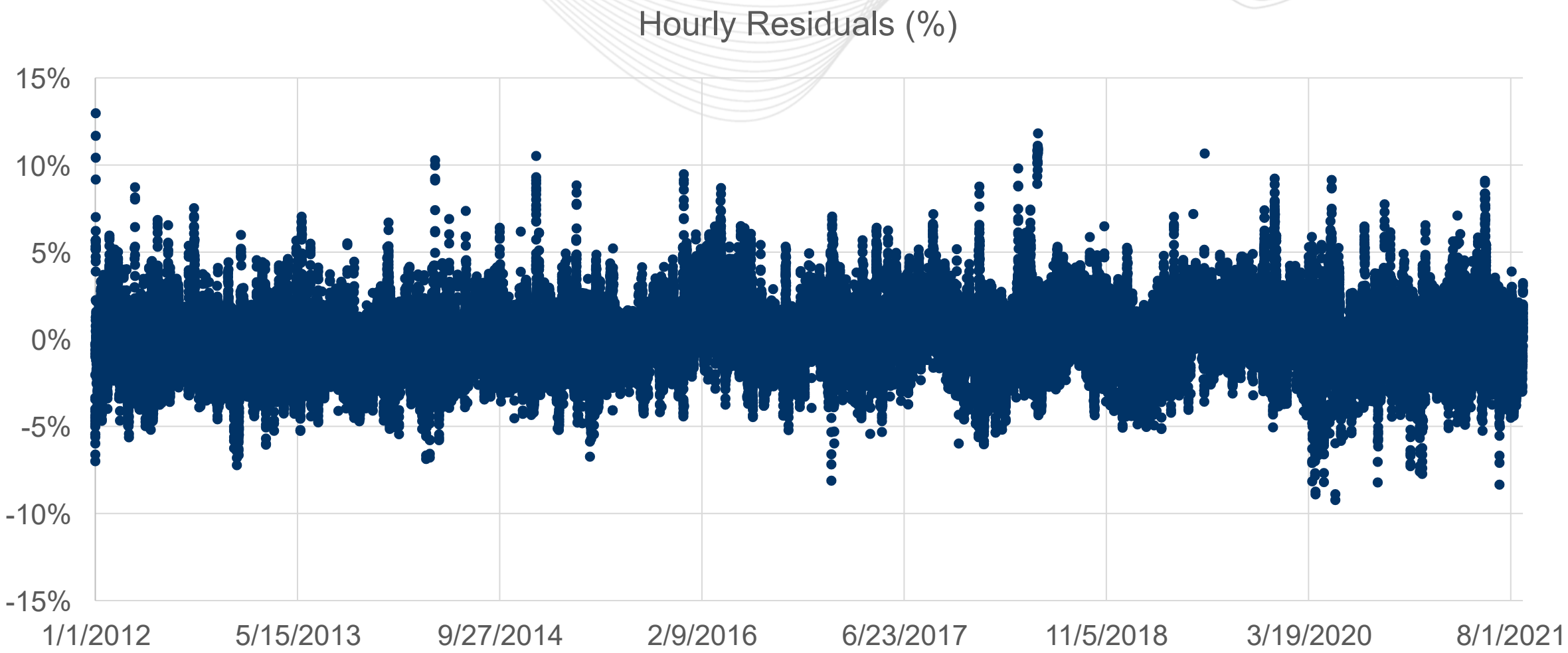
RTO Residuals



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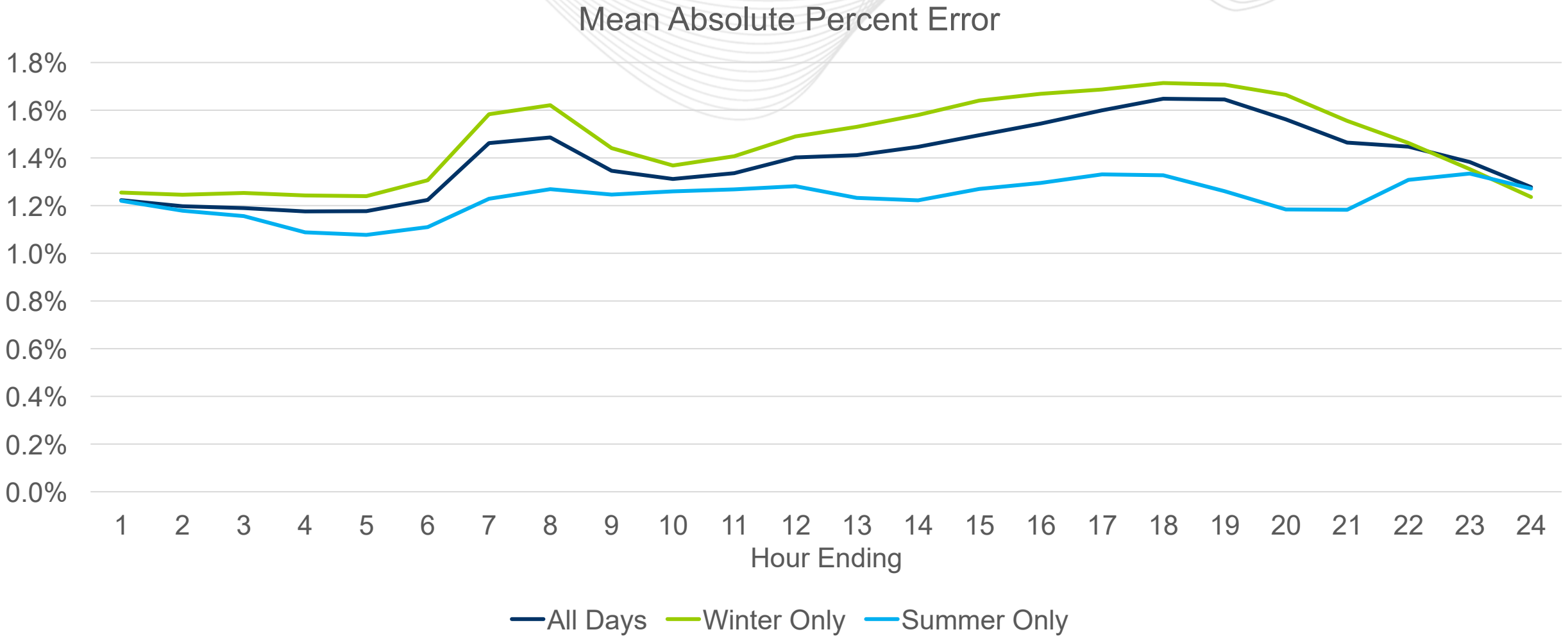
RTO Residuals Summary



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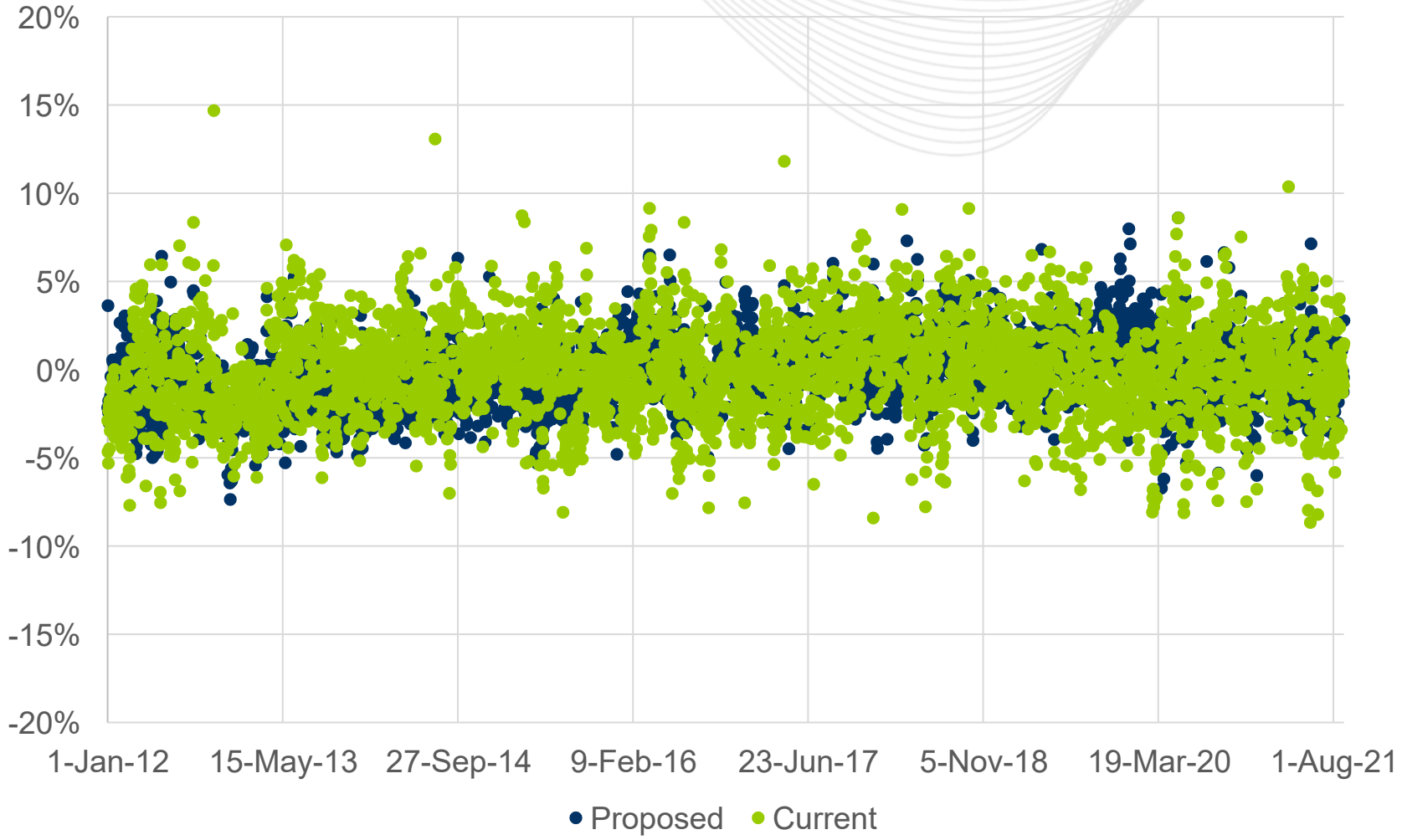
Daily Residual Comparison



Mean Absolute Percent Error

- Current: 2.2%
- Proposed: 1.5%

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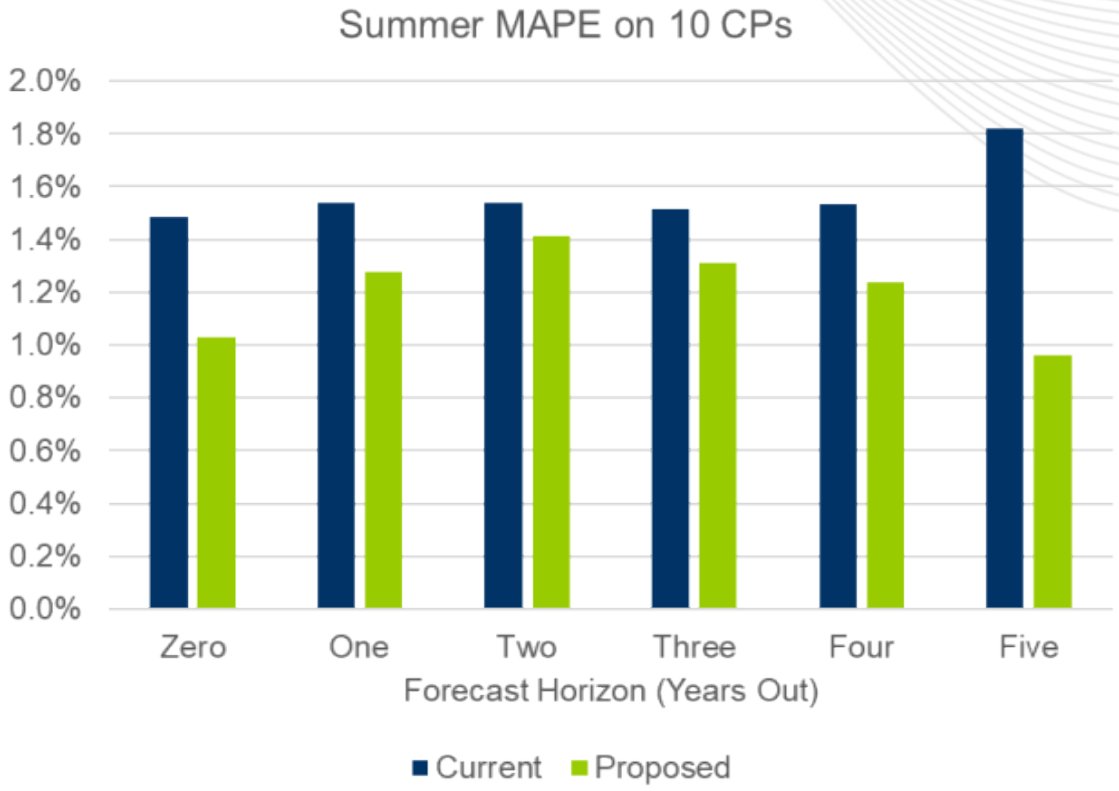
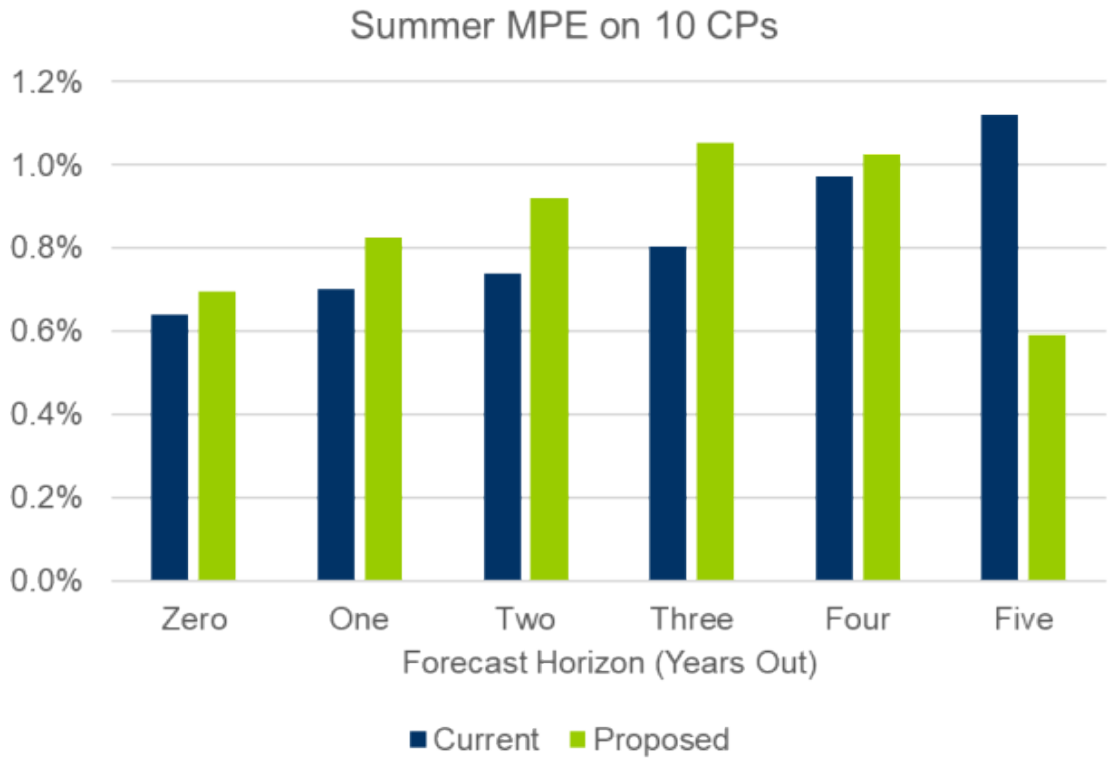
Summer Accuracy





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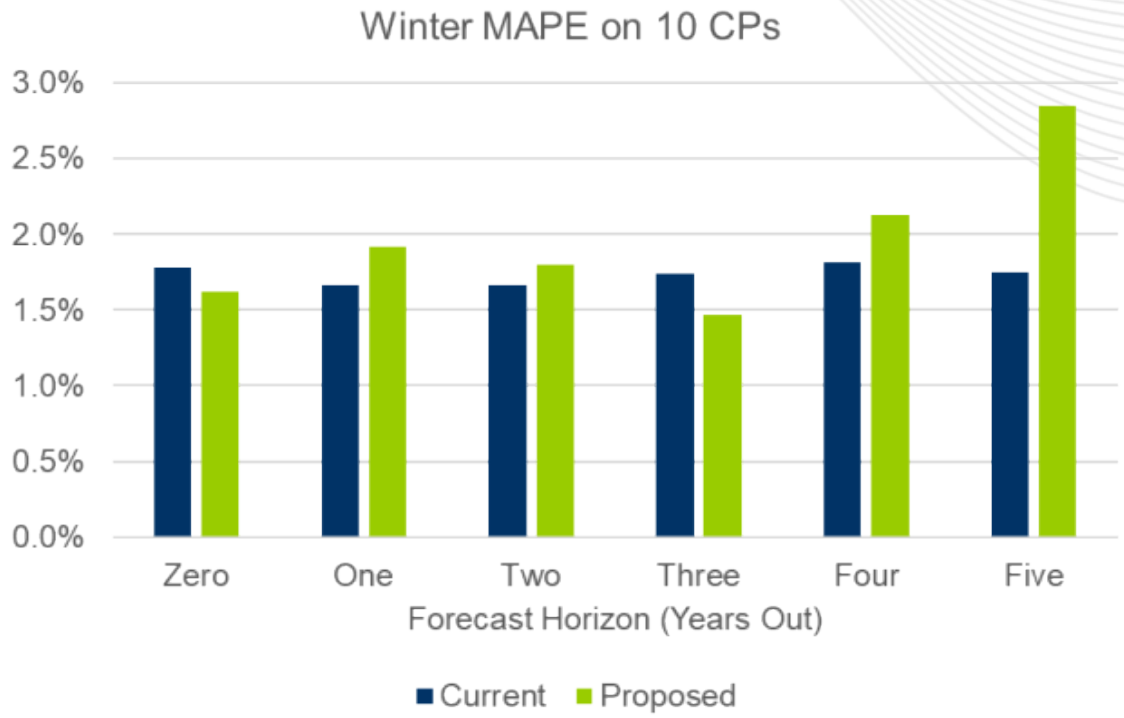
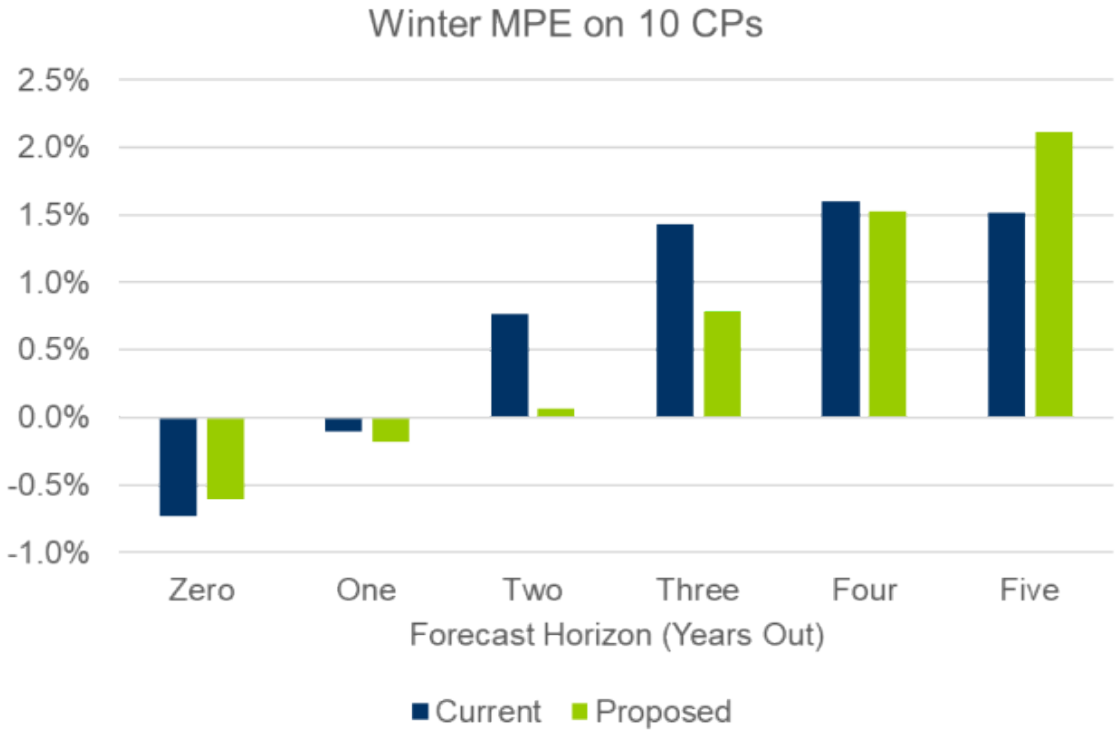
Winter Accuracy





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- Seeking Stakeholder Feedback

- PJM Plan
  1. Use monthly sector models to construct driver variables
  2. Use hourly load models
  3. Consider new technologies through hourly shapes
  4. Continue with current historical weather simulation period to capture the range of potential weather events the RTO may face. Still considering whether to shorten to a 7-day rotation, but that decision has negligible impact on results.

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2023 Load Forecast Plan

- PJM is working on updating model inputs (load, end-use, economics, BtM solar & batteries, EVs, etc)
- Will present findings at November LAS (11/29) and December PC (12/6)
- Load Forecast Report will be published late December with Load Forecast Supplement to follow.

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Contact

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